

I claim:

1. A safety syringe including a sliding casing, a needle, a syringe barrel, a piston, a spring, and a plunger inside the syringe barrel; a luer tip with a needle luer skirt thereon provided at the front end of the syringe barrel to mate with the needle that is installed on the luer tip at the front end of the syringe barrel through the needle luer skirt, with the front end of the plunger having a connection part to engage with the piston, is characterized in that:

the sliding casing is moveably sleeved on the outside of the syringe barrel, with two elastic extension plates on each of which a connection part is respectively being provided at the rear portion of the sliding casing; the front end of the sliding casing is a reduced section whose front end has a guard board whose center is provided with a hole permitting the needle to reach out;

a vertical ringy face is provided at the front end of the syringe barrel whose surface has a long groove to engage with elastic locking plates, the front portion of the long groove is provided with a position limiting plate that can be locked between the two elastic locking plates; the outside surface of the syringe barrel is provided with two connecting portions to respectively correspond to the connection part of each elastic extension plate, the connecting portions can engage with the connection parts on the elastic extension plates respectively;

the plunger is provided with a sliding casing off-locking plate corresponding to the elastic extension plate of the sliding casing, at least one opposite faces of the sliding casing off-locking plate and the elastic extension plate of the sliding casing is a slant face; when the sliding casing off-locking

plate and the elastic extension plate of the sliding casing is in contact with each other, the sliding casing off-locking plate may make the said elastic extension plate of the sliding casing opening toward its two sides under the action of the slant face;

5 the spring is sleeved on the casing of the needle luer shirt of the syringe barrel and is compressed between the guard board of the sliding casing and the vertical ringy face of the syringe barrel.

2. The safety syringe according to claim 1, wherein the syringe barrel is
10 provided with at least two resistance rings at its rear portion; the syringe further includes a latching casing whose front portion is a tapered plane contracted inward with at least two long grooves thereon and whose surface is provided with a locking ring in the central section; the latching casing is installed at the rear portion of an inner hole of the syringe barrel and is sleeved on the plunger;

15 the main body of the plunger is a "+" shaped rib plate including a front "+" shaped rib plate, a middle "+" shaped rib plate, a stepped resistance plate and a rear "+" shaped rib plate; the outline size of the front "+" shaped rib plate is slightly larger than the diameter of the inner hole at the front end of the latching casing, the outline size of the middle "+" shaped rib plate is smaller
20 than the diameter of the inner hole at the front end of the latching casing, the number of the stepped resistance plate whose outer diameter is slightly larger than the diameter of the inner hole at the front end of the latching casing is at least one.

3. The safety syringe according to claim 2, wherein the rear portion of the inner hole of the syringe barrel has a front resistance ring with a triangular cross section and a rear resistance ring with a trapezoid-shaped cross section;

5 the cross section of the front resistance ring is triangular and its inner diameter is slightly smaller than the inner diameter of the syringe barrel, the angle between the front slant face of the front resistance ring and the axis is small, the angle between the rear slant face and the axis is large; the cross section of the rear resistance ring is trapezoid-shaped, the front slant face and the rear slant

10 face of the rear resistance ring respectively hold a large angle with respect to the axis of the syringe barrel, the inner diameter of the rear resistance ring is smaller than the inner diameter of the front resistance ring; the front end face of the locking ring of the latching casing is perpendicular to the axis, the angle between the rear slant face and the axis is large, the outer diameter of the

15 locking ring equals to the diameter of the inner hole of the syringe barrel, the width of the locking ring is slightly smaller than the width between the front resistance ring and the rear resistance ring inside the syringe barrel; the distance from the front end face of the locking ring of the latching casing to the rear slant face of the front resistance ring is slightly larger than the distance

20 from the front end face of the latching casing to the rear end face of the stepped resistance plate of the plunger.

4. The safety syringe according to claim 1 or 2 or 3, wherein the

connection part is the locking notch formed on the elastic extension plate, the connecting portion is a protruding platform provided on the syringe barrel to correspond to the locking notch, the protruding platform can be locked in the locking notch.

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5. The safety syringe according to claim 1 or 2 or 3, wherein the connection part of the elastic extension plate is a "T" shaped plate, a protruding ring is provided at the rear end of the syringe barrel, the connecting portion is a groove formed on the protruding ring to engage with the "T" shaped plate, the "T" shaped plate can be locked in the groove.

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6. The safety syringe according to claim 1 or 2 or 3, wherein the connection part of the elastic extension plate is a bark-shaped plate, the connecting portion of the syringe barrel is the rear end face of the syringe barrel on which the bark-shaped plate may be locked.

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7. The safety syringe according to claim 1 or 2 or 3, wherein the rear portion of the sliding casing is provided with two grooves, the two grooves are respectively provided with the elastic extension plate, the connection part on the elastic extension plate is the locking notch provided on the elastic extension plate, the connecting portion is a protruding platform provided on the syringe barrel to correspond to the locking notch in which the protruding platform can be locked.

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8. The safety syringe according to claim 1 or 2 or 3, wherein the diameter of the inner hole of the piston is larger than the diameter of the connection part of the head of the plunger and the length of the inner hole is 1 to 5 mm larger than the thickness of the head of the plunger.

9. The safety syringe according to claim 4, wherein the diameter of the inner hole of the piston is larger than the diameter of the connection part of the head of the plunger and the length of the inner hole is 1 to 5 mm larger than the thickness of the head of the plunger.

10. The safety syringe according to claim 5, wherein the diameter of the inner hole of the piston is larger than the diameter of the connection part of the head of the plunger and the length of the inner hole is 1 to 5 mm larger than the thickness of the head of the plunger.

11. The safety syringe according to claim 6, wherein the diameter of the inner hole of the piston is larger than the diameter of the connection part of the head of the plunger and the length of the inner hole is 1 to 5 mm larger than the thickness of the head of the plunger.

12. The safety syringe according to claim 7, wherein the diameter of the inner hole of the piston is larger than the diameter of the connection part of the

head of the plunger and the length of the inner hole is 1 to 5 mm larger than the thickness of the head of the plunger.

13. The safety syringe according to claim 1 or 2 or 3 or 9 or 10 or 11 or 12,
5 wherein the rear "+" shaped rib plate of the plunger is provided with a circular anti-pull-off plate from which the distance to the rear stepped plate is equal to the distance from the front end face of the latching lock casing to the rear end face of the locking ring, and the outer diameter of the circular anti-pull-off plate is slightly smaller than the diameter of the inner hole at the rear end of the
10 latching lock casing.

14. The safety syringe according to claim 4, wherein the rear "+" shaped rib plate of the plunger is provided with a circular anti-pull-off plate from which the distance to the rear stepped plate is equal to the distance from the
15 front end face of the latching casing to the rear end face of the locking ring, and the outer diameter of the circular anti-pull-off plate is slightly smaller than the diameter of the inner hole at the rear end of the latching casing.

15. The safety syringe according to claim 5, wherein the rear "+" shaped
20 rib plate of the plunger is provided with a circular anti-pull-off plate from which the distance to the rear stepped plate is equal to the distance from the front end face of the latching casing to the rear end face of the locking ring, and the outer diameter of the circular anti-pull-off plate is slightly smaller than the

diameter of the inner hole at the rear end of the latching casing.

16. The safety syringe according to claim 6, wherein the rear "+" shaped
rib plate of the plunger is provided with a circular anti-pull-off plate from
5 which the distance to the rear stepped plate is equal to the distance from the
front end face of the latching casing to the rear end face of the locking ring, and
the outer diameter of the circular anti-pull-off plate is slightly smaller than the
diameter of the inner hole at the rear end of the latching casing.

10 17. The safety syringe according to claim 7, wherein the rear "+" shaped
rib plate of the plunger is provided with a circular anti-pull-off plate from
which the distance to the rear stepped plate is equal to the distance from the
front end face of the latching casing to the rear end face of the locking ring, and
the outer diameter of the circular anti-pull-off plate is slightly smaller than the
15 diameter of the inner hole at the rear end of the latching casing.

18. The safety syringe according to claim 8, wherein the rear "+" shaped
rib plate of the plunger is provided with a circular anti-pull-off plate from
which the distance to the rear stepped plate is equal to the distance from the
20 front end face of the latching casing to the rear end face of the locking ring, and
the outer diameter of the circular anti-pull-off plate is slightly smaller than the
diameter of the inner hole at the rear end of the latching casing.

19. The safety syringe according to claim 1 or 2 or 3 or 9 or 10 or 11 or 12 or 14 or 15 or 16 or 17 or 18, wherein a weak connecting area is provided on the rear "+" shaped rib plate of the plunger, two small breakable connecting pillars symmetric with the centers connect the horizontal rib plates, while a
5 breakable narrow belt connects the vertical rib plates.

20. The safety syringe according to claim 4, wherein a weak connecting area is provided on the rear "+" shaped rib plate of the plunger, two small breakable connecting pillars symmetric with the centers connect the horizontal
10 rib plates, while a breakable narrow belt connects the vertical rib plates.

21. The safety syringe according to claim 5, wherein a weak connecting area is provided on the rear "+" shaped rib plate of the plunger, two small breakable connecting pillars symmetric with the centers connect the horizontal
15 rib plates, while a breakable narrow belt connects the vertical rib plates.

22. The safety syringe according to claim 6, wherein a weak connecting area is provided on the rear "+" shaped rib plate of the plunger, two small breakable connecting pillars symmetric with the centers connect the horizontal
20 rib plates, while a breakable narrow belt connects the vertical rib plates.

23. The safety syringe according to claim 7, wherein a weak connecting area is provided on the rear "+" shaped rib plate of the plunger, two small

breakable connecting pillars symmetric with the centers connect the horizontal rib plates, while a breakable narrow belt connects the vertical rib plates.

24. The safety syringe according to claim 8, wherein a weak connecting
5 area is provided on the rear "+" shaped rib plate of the plunger, two small breakable connecting pillars symmetric with the centers connect the horizontal rib plates, while a breakable narrow belt connects the vertical rib plates.

25. The safety syringe according to claim 13, wherein a weak connecting
10 area is provided on the rear "+" shaped rib plate of the plunger, two small breakable connecting pillars symmetric with the centers connect the horizontal rib plates, while a breakable narrow belt connects the vertical rib plates.

26. The safety syringe according to claim 1 or 2 or 3 or 9 or 10 or 11 or 12
15 or 14 or 15 or 16 or 17 or 18 or 20 or 21 or 22 or 23 or 24 or 25, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

20 27. The safety syringe according to claim 4, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

28. The safety syringe according to claim 5, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

29. The safety syringe according to claim 6, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

30. The safety syringe according to claim 7, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

31. The safety syringe according to claim 8, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

32. The safety syringe according to claim 13, wherein between the middle "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a

transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

33. The safety syringe according to claim 19, wherein between the middle
5 "+" shaped rib plate and the rear "+" shaped rib plate of the plunger is a transitional slant face or a transitional tapered platform, the angle formed by the slant face and the axis is not smaller than 30 degrees.

34. The safety syringe according to claim 19, wherein the respective end
10 portion of two elastic locking plates at the short groove of the sliding casing protrudes toward the inner hole and the protruding height is slightly larger than the depth of the long groove in the syringe barrel; the height of the protruding platform is not smaller than the depth of the locking notch and the width of the protruding platform is smaller than the width of the locking notch.

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35. The safety syringe according to claim 7, wherein the respective end
portion of two elastic locking plates at the short groove of the sliding casing
protrudes toward the inner hole and the protruding height is slightly larger than
the depth of the long groove in the syringe barrel; the height of the protruding
20 platform is not smaller than the depth of the locking notch and the width of the
protruding platform is smaller than the width of the locking notch.

36. The safety syringe according to claim 9 or 12 or 14 or 17 or 20 or 23

or 27 or 30, wherein the respective end portion of two elastic locking plates at the short groove of the sliding casing protrudes toward the inner hole and the protruding height is slightly larger than the depth of the long groove in the syringe barrel; the height of the protruding platform is not smaller than the
5 depth of the locking notch and the width of the protruding platform is smaller than the width of the locking notch.